BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Reading Meat Store - Electric Heaters - Updated

As designed

Date: Fri Nov 17 09:34:01 2023

Administrative information

Building Details

Address: Reading Meat Store, Deacon Way, Reading, RG30 6AZ

Certifier details

Name: Darren Baker

Telephone number: 0845 094 1593

Address: Melin Consultants, The Beacon, Dafen Business Park, Llanelli, SA14 8LQ

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.22

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 130.33

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	16.23	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	20.88	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	174.8	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	224.76	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-Limit}}$	$U_{a\text{-Calc}}$	$U_{i\text{-Calc}}$	First surface with maximum value
Walls*	0.26	0.21	0.26	NT000005_W2_A0
Floors	0.18	0.17	0.26	NT000004_F_A1
Pitched roofs	0.16	0.15	0.15	NT000000_C
Flat roofs	0.18	0.18	0.18	NT00000C_C_A0
Windows** and roof windows	1.6	1.2	1.2	NT000005_W-1_O0
Rooflights***	2.2	2.2	2.2	NT000004_C_O0
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-Limit}}$ = Limiting area-weighted average U-values [W/(m²K)]

$U_{i\text{-Calc}}$ = Calculated maximum individual element U-values [W/(m²K)]

$U_{a\text{-Calc}}$ = Calculated area-weighted average U-values [W/(m²K)]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check.

*** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m²K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m³/(h.m²) at 50 Pa	8	15

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Main system

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

1- SYST0000-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0
Standard value	N/A	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Unit 1 Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 2 Kitchenette	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 1 Shower	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 1 WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 2 WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 2 Shower	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 1 Shower	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 1 WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 2 WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 2 Shower	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 1 WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 1 Shower	0.3	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Unit 2 Showroom	100	100	1.5

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Unit 2 Showroom	100	100	1.5
Unit 1 Kitchenette	100	-	-
Unit 1 Office 1	100	-	-
Unit 1 Showroom	100	100	1.5
Unit 2 Kitchenette	100	-	-
Unit 2 Office	100	-	-
Unit 1 Shower	100	-	-
Unit 1 WC	100	-	-
Unit 2 WC	100	-	-
Unit 2 Shower	100	-	-
Unit 1 Shower	100	-	-
Unit 1 WC	100	-	-
Unit 2 WC	100	-	-
Unit 2 Shower	100	-	-
Unit 1 WC	100	-	-
Unit 1 Shower	100	-	-
Unit 2	100	-	-
Unit 1	100	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Unit 2 Showroom	YES (+88.6%)	NO
Unit 2 Showroom	NO (-62.7%)	NO
Unit 1 Kitchenette	NO (-92.8%)	NO
Unit 1 Office 1	YES (+91.3%)	NO
Unit 1 Showroom	YES (+34.1%)	NO
Unit 2 Kitchenette	YES (+136%)	NO
Unit 2 Office	NO (-10.1%)	NO
Unit 2	YES (+108.2%)	NO
Unit 1	YES (+105.6%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	772.5	772.5
External area [m^2]	2203.8	2203.8
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	15	5
Average conductance [W/K]	795.87	720.02
Average U-value [W/m^2K]	0.36	0.33
Alpha value* [%]	14.87	41.81

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
15	**Retail/Financial and Professional Services**
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
85	**Storage or Distribution**
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	27.17	15.35
Cooling	0	0
Auxiliary	0.08	0.11
Lighting	12.32	7.14
Hot water	111.83	105.57
Equipment*	30.88	30.88
TOTAL**	**151.4**	**128.17**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	3.88	10.22
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*3.88*	*10.22*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	418.78	313.27
Primary energy [kWh_{PE}/m^2]	224.76	174.81
Total emissions [kg/m^2]	20.88	16.23

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	237.4	174.8	82.4	0	0.2	0.8	0	1	0
	Notional	224.6	89.1	46.6	0	0.3	1.34	0	----	----
[ST] No Heating or Cooling										
	Actual	291.7	130.3	0	0	0	0	0	0	0
	Notional	223.4	89.7	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type